## Space Weather Forecast

Issued on Thursday, 11 January 2024 at 12:07 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Ongoing likelihood of isolated Moderate flares, with a slight chance of Strong flares**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Moderate with two Moderate-class flares. The largest an M1.9 at 10/2328 UTC from the region at the northwest limb, and an M1.4 peaking at 10/1255UTC from the new region now just on the southeast limb.

There are currently twelve sunspot regions on the visible disc. The region at the northwest limb is now only partially visible as it rotates around the northwest limb. There is one moderate size bipolar group in the northwest, which continues to show slight overall growth. In the southeast, a smaller bipolar group which had previously shown steady growth, is now showing slight weakening, and is maturing into a relatively simple configuration. Three other moderate size groups in the southeast quadrant have all shown little overall change. A new sunspot in the northwest has gained some additional small spots but is currently a simple, small bipolar group. A further new region is rotating around the southeast limb, and given a preliminary single spot unipolar classification, but this may change as it becomes more clearly visible. Other groups are small and magnetically simple and either stable or in decay.

A couple of coronal mass ejections (CMEs) were observed, including a large and impressive eruption from just over the east limb at around 10/2030 UTC. These were modelled and do not show an Earth-directed component. A further filament eruption was observed in the northeast, beginning around 11/0500UTC, with an associated CME. This will also be assessed once updated coronagraph imagery becomes available. No other potential Earth-directed CMEs were observed.

**Solar Wind / Geomagnetic Activity:** Solar winds were predominantly at slightly elevated speeds, varying mainly between 400 km/s and 500 km/s. Interplanetary magnetic field (IMF) was occasionally moderate through the first half of the period, then mostly weak. The north-south component varied between being weakly north and weakly southward pointed. Geomagnetic activity was Quiet (Kp 1-2).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is near background levels.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate solar activity is likely to continue with further isolated Moderate class flares, and a slight chance of isolated Strong class flares.

**Solar Wind / Geomagnetic Activity:** There is a potential glancing CME arrival. This left the Sun on 09 Jan due to a filament eruption in the southeast disc, and gives a chance of a very

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slight glance Day 3 (13 Jan). Otherwise, background to slightly elevated wind speeds are expected. Quiet geomagnetic conditions are expected for much of the period, but may rise to give a spell of Unsettled with a chance of Active with any glancing CME.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is expected to continue near background levels. However, there is a slight chance of rising to a minor radiation storm (S1) or greater, should there be any notable flare activity.

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 1 | 1 | 5 | 1 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 60 | 60 | 55 | 50 |
| Very Active | R3 to R5 X | No | 10 | 10 | 10 | 10 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 10 | 10 | 10 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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